

CORRECTED VERSION

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
22 April 2004 (22.04.2004)

PCT

(10) International Publication Number
WO 2004/034409 A1

(51) International Patent Classification⁷: **H01B 3/30**

(21) International Application Number:
PCT/US2003/031465

(22) International Filing Date: 3 October 2003 (03.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/415,987 4 October 2002 (04.10.2002) US

(71) Applicant (for all designated States except US): **RENSE-
LAER POLYTECHNIC INSTITUTE [US/US]**; 110 8th
Street, Troy, NY 12108 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **NELSON, J., Keith**
[GB/US]; 2329 Knolls View Drive, Niskayuna, NY 12309
(US).

(74) Agent: **MICHALOS, Peter, C.**; Notaro & Michalos P.C.,
Suite 110, 100 Dutch Hill Road, Orangeburg, NY 10962-
2100 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,
VC, VN, YU, ZA, ZM, ZW.

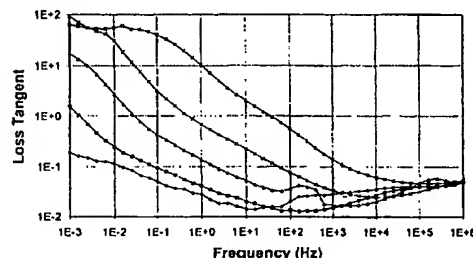
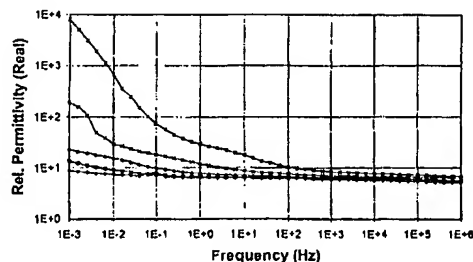
(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: **NANOMETRIC COMPOSITES AS IMPROVED DIELECTRIC STRUCTURES**



(57) Abstract: A dielectric is provided which possesses high dielectric constant and high dielectric strength, while having the capabilities of a polymer. The dielectric comprises a nanometric composite, which includes a stoichiometric nano- particulate filler embedded in a polymer or resin matrix. Filler particles are reduced in physical size to dimension to the same order as the polymer chain length of the host material and interact cooperatively thereby mitigating the associated Maxwell-Wagner process and reducing interfacial polarization. The internal fields for the new formulation are nearly a factor of 10 lower then for conventional (micro) material. The large changes in the internal field of the composite permit engineering of nanocomposite materials with enhanced electric strength and improved voltage endurance properties.

WO 2004/034409 A1



(48) Date of publication of this corrected version:

5 August 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(15) Information about Correction:

see PCT Gazette No. 32/2004 of 5 August 2004, Section II